

referenced aerial photographs from 1958 and 1998 time periods. The shoreline was digitally traced (outlined) using ESRI GIS and mapping software, ArcGIS®. Once the entire shoreline was digitized for the two different time periods (Figure 4), the difference in shoreline position was

measured at 150-foot spacing along the entire shoreline for the 40-year period to determine the amount of either erosion or accretion and to calculate the rate of change (distance/time).

SHORELINE CHANGE IN THE NEUSE RIVER ESTUARY

Over 40 years (1958-1998), the vast majority (93%) of the Neuse River Estuary shoreline eroded (the shoreline moved landward). Only a small fraction (6.6%) of the shoreline accreted (the shoreline moved seaward), and less than 1% did not change (Figure 5). The rate of shoreline change varied widely from -11.5 feet per year (erosion) to +9.5 feet per year (accretion). The average shoreline change rate for the entire study area, including the protected tributaries, over the 40 year period was approximately -1 foot per year (erosion).

The rate of shoreline retreat is influenced by many factors, including but not limited to wave energy and duration, fetch of water that generates these waves, and boat wakes (Table

2). The influence of fetch, and therefore the resultant wave energy, can easily be seen in the erosion rates observed in the Neuse River Estuary. For example, some of the lowest erosion rates are found in the small tributaries and in head water portions of the estuary (symbols are mostly yellows and greens, Figure 5). In contrast, those areas along the main trunk of the estuary exposed to a fetch that included Pamlico Sound, had the greatest rates of erosion (Figure 5). This higher erosion rate along much of the Neuse River trunk is associated with the relentless wave attack during windy days and strong storms (e.g., hurricanes and nor'easters). With rising sea level and possible enhanced storm activity, it is highly probable that estuarine shoreline recession will become more severe in the near future.

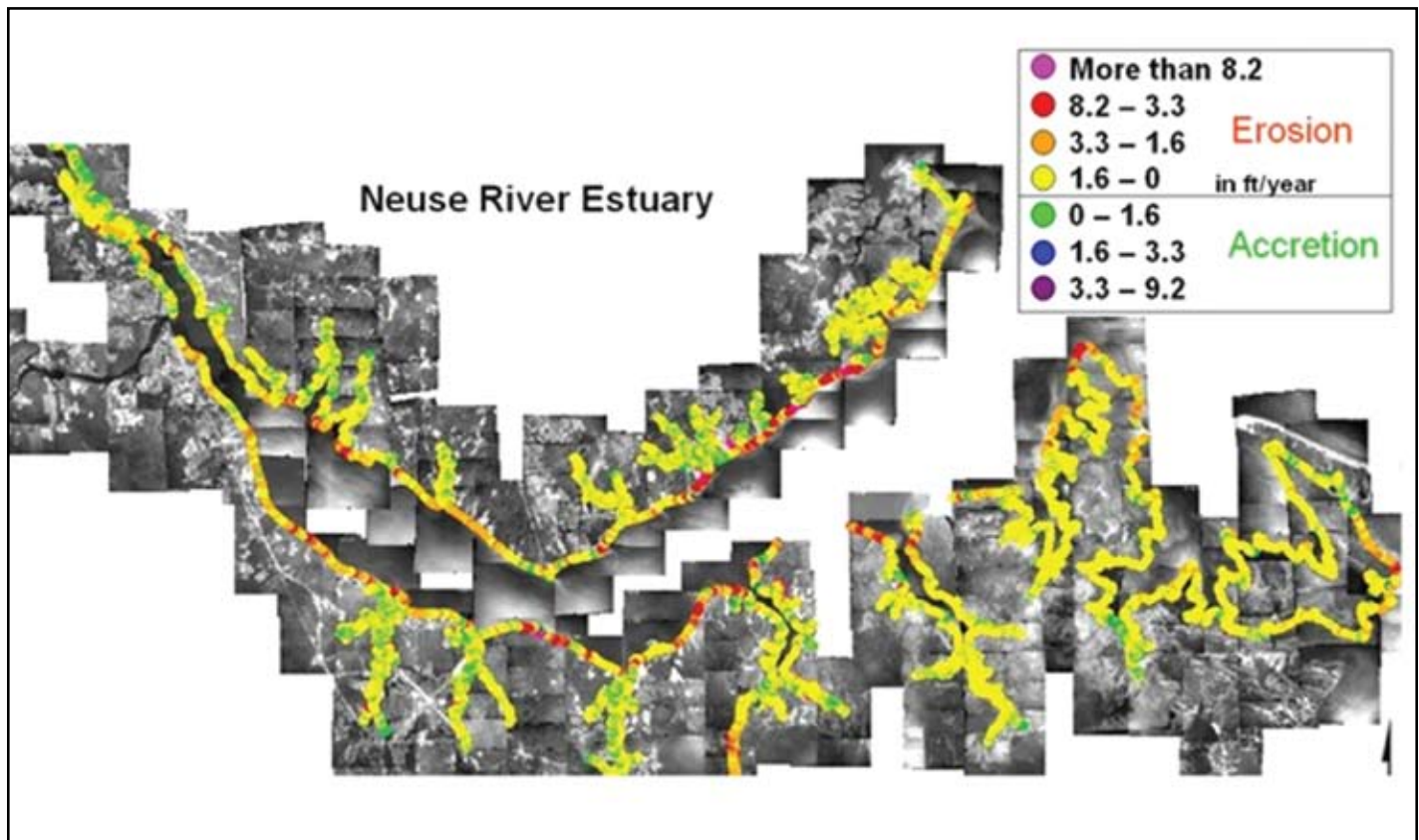


Figure 5. Map of shoreline change rate between 1958 and 1998 (40 years) along the Neuse River Estuary. Areas with higher erosion rates are denoted by yellow to pink, while areas that have accreted are represented by green to purple.